National Aeronautics and Space Administration

GRCop-84Z

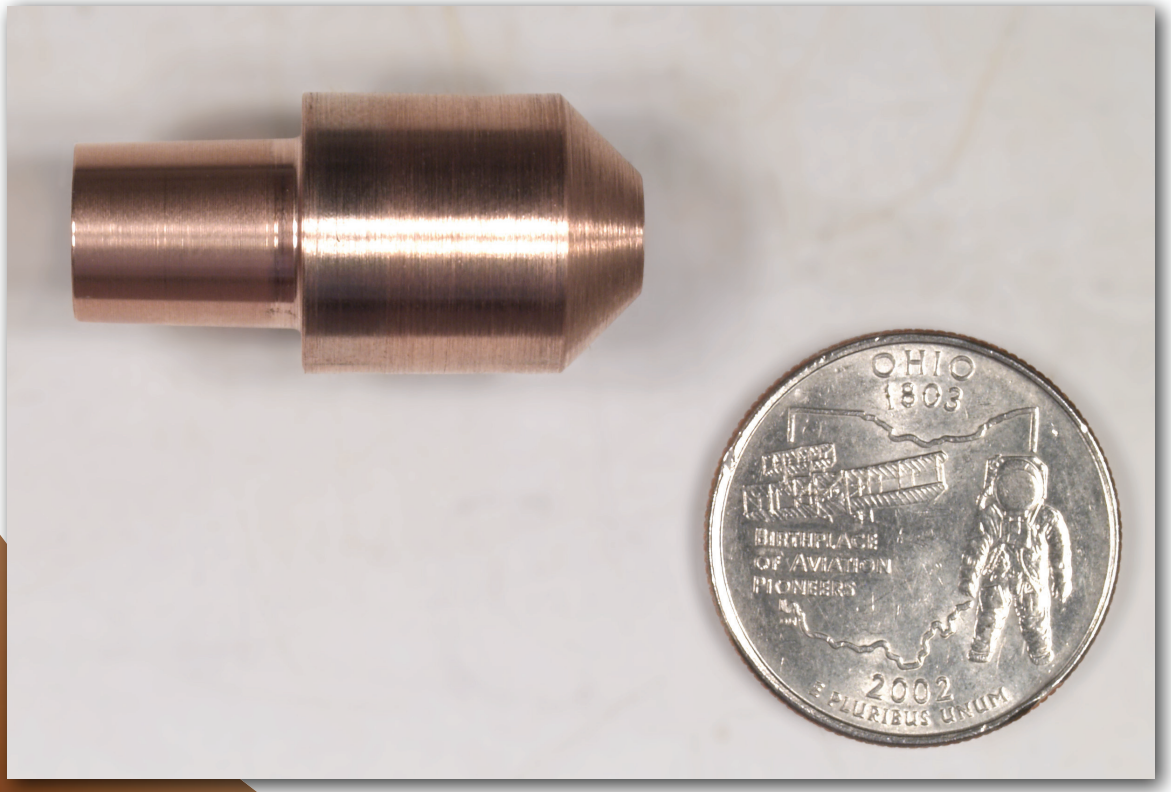
A better alloy for resistance welding electrodes

TECHNOLOGY OPPORTUNITY

NASA's Glenn Research Center invites companies to establish partnerships to investigate the use of GRCop-84Z for resistance welding electrodes. GRCop-84Z is a copper-based alloy that shows significant improvements in creep rate and low-cycle fatigue (LCF) life when compared to GlidCop AL-15.

BENEFITS

- **Flexibility:** Wide variety of powder metallurgy and other conventional processing techniques can be used
- **Higher strength:** Higher room and elevated temperature strength means that the welding electrodes will not deform as much under welding mechanical loads
- **Longer electrode life:** Lower creep rates and longer creep lives (up to 3 times compared to GlidCop AL-15), and better LCF life (up to 2 times compared to GlidCop AL-15) means longer electrode lives
- **Higher quality welds:** Because the welding electrodes will deform slower and less, the quality of the weld will remain high for a longer period of time. This will improve overall quality and longevity



Manufacturing Technologies
AUTOMOTIVE INDUSTRY WORKSHOP

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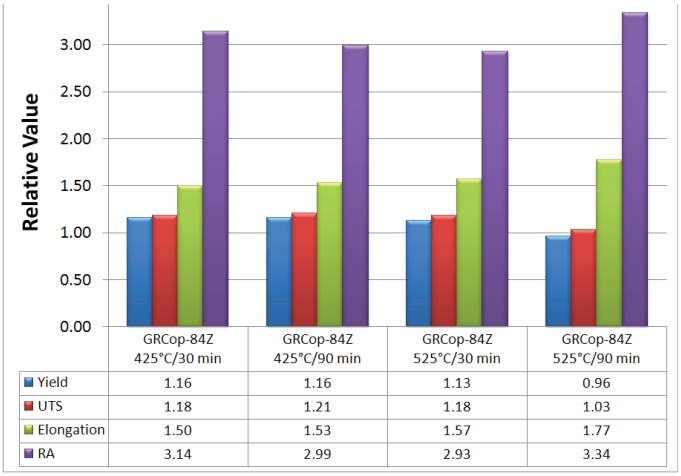
TECHNOLOGY DETAILS

GRCop-84Z is a copper-based alloy originally developed for rocket engine liners requiring high temperature strength. GRCop-84Z is a copper base alloyed with 6.7 percent chromium, 5.8 percent niobium, and 0.5 percent zirconium. The resulting alloy has exceptional high temperature strength and creep resistance as well as improved LCF life. Initial welding characterization testing of GRCop-84Z indicates that this alloy will be a game changer for resistance welding electrode applications. Significantly increased creep life and LCF properties of GRCop-84Z offer the potential to increase electrode life by a factor of 2 to 3 times.

HOW IT WORKS

GRCop-84Z has the addition of a small quantity of zirconium, which when used for electrode tips, helps to resist sticking of the tips to zinc-coated materials.

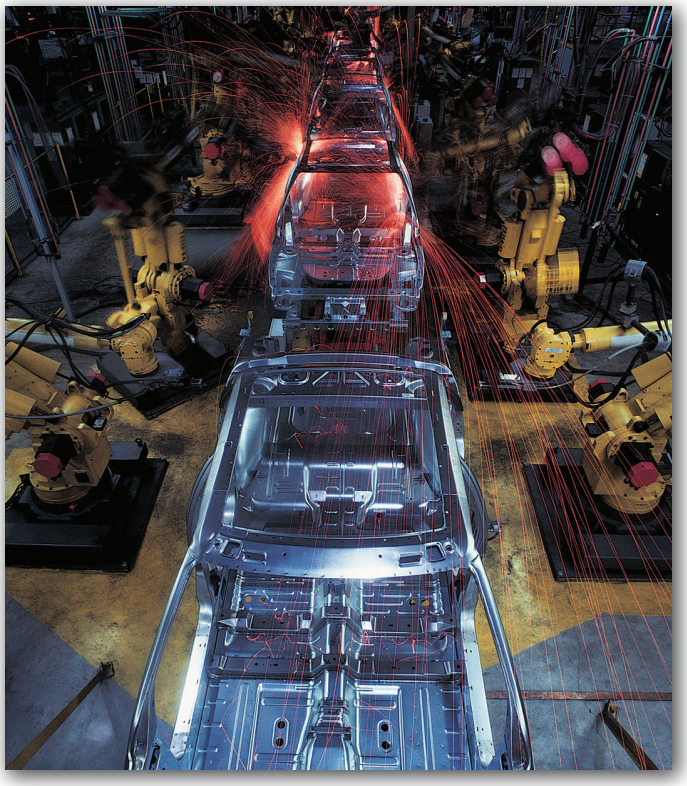


	GRCop-84Z 425°C/30 min	GRCop-84Z 425°C/90 min	GRCop-84Z 525°C/30 min	GRCop-84Z 525°C/90 min
Yield	1.16	1.16	1.13	0.96
UTS	1.18	1.21	1.18	1.03
Elongation	1.50	1.53	1.57	1.77
RA	3.14	2.99	2.93	3.34

500 °C tensile properties of GRCop-84Z relative to GlidCop AL-15.

WHY IT IS BETTER

High-quality, more consistent welds will improve overall car production quality. GRCop-84Z properties when compared to GlidCop AL-15 will result in longer electrode life and improved weld quality. The increased welding electrode life will also lead to less assembly line maintenance and less downtime.



LICENSING AND PARTNERING OPPORTUNITIES

Glenn's Office of Technology Partnerships and Planning seeks to transfer technology to and from NASA to benefit the space program and U.S. industry. NASA invites companies to partner with NASA Glenn Research Center in the use of GRCop-84Z for use as a welding electrode alloy or for other automotive applications.

FOR MORE INFORMATION

For more information about this and other technology licensing opportunities, please contact

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